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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,604	03/27/2007	David Robert McKenzie	115427.00008	5385
72535 7590 05/04/2010 MCCARTER & ENGLISH, LLP STAMFORD CANTERBURY GREEN 201 BROAD STREET, 9TH FLOOR STAMFORD, CT 06901				
EXAMINER PADGETT, MARIANNE L				
ART UNIT		PAPER NUMBER		
1715				
MAIL DATE		DELIVERY MODE		
05/04/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/577,604

**Applicant(s)**

MCKENZIE ET AL.

**Examiner**

MARIANNE L. PADGETT

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/27/2006, 3/27/2007 & 8/7/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/GS/US)  
Paper No(s)/Mail Date 4/27/06

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

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1. The examiner **notes** that this application is a **371**, where there was an **article 34 amendment** to the claims, thus the amended sheets, labeled as "Received 10 October 2005", have claims 1-14, are the claims being examined, however the examiner also notes that the original claim listings have claims 1-16, thus in order to keep the record straight in the scanned file, claims 15 & 16 will be listed as canceled, as they were effectively canceled by the article 34 amendment. All future claims listings should show this & any new claims should start at claim 17.

It is also noted that there was an amendment to the specification in the form of a replacement sheet, however as this is not the means by which the specification is amended in US practice, so this amendment cannot be properly entered, hence if applicants desire this amendment be made, they should submit an amendment in proper US format.

The examiner notes that applicants' Australian priority document (39 page body of specification & 15 figures) is considerably different than the 7 page specification body, with 5 figures of the PCT & present application, however many of the limitations appear to be found there in on pages 35-37, figures 9-13, especially figure 11 & page 37, lines 6-23, except that the Australian priority document does **not** appear to **teach** that the component being ion bombarded does not contact the mesh, as is required in present independent **claim 1**. This priority document has teachings where the mesh is rotated & components being ion implanted are tumbled therein, and alternative teachings where the non-conformal mesh may be stationary, with the polymeric component being ion implanted being rotated or oscillated inside mesh 86, which may be achieved by rotating &/or oscillating the support shaft, preferably connected to the polymeric component through a hole in the mesh. The support shaft 85 is taught to preferably not connect with the high-voltage feed through 87 or the power supply 88, but the examiner found no prohibition against the claimed generic component that is merely being ion bombarded from contacting the claimed stationery mesh, thus the claims as presently written differ from the teachings of

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this Australian priority document, so the effective filing date of the present application is considered to be that of the PCT, i.e. 10/24/2004.

Also, limitations concerning a second mesh, as found in present claims 3 or 9, appear to be absent from the Australian document. The plasma apparatus & process that employs the conductive mesh in the Australian priority document is also explicitly taught to be performing ion implantation on polymeric substrates (e.g. components, specifically for a implantable blood pump component), whereas the presently claimed apparatus and process are generically for modifying a surface of a generic component (e.g. any substrate) with the plasma via ion bombardment, which encompasses not just ion implantation, but etching, or cleaning, or surface functionalization, or surface coating, etc., of not just polymer components of implantable blood pumps, but any type of substrate, of any material used for any purpose, which further shows a difference in scope, support & teachings, then appear to be present in the Australian priority document.

2. With respect to the scope of independent apparatus **claim 1** & its dependent **claims 2-7**, note that in US practice, method limitations recited in an apparatus claim, only limit the apparatus if they require or necessitate specific capabilities or structures, such that the apparatus structure must be capable of operating with recited method limitations. Furthermore, it is not necessary for a prior art apparatus to actually ever employ such capabilities in order to read on such method limitations in apparatus claims. More specifically, independent claim 1 is directed to an apparatus required to have (1) a non-conformal conductive mesh in a fixed position, to which a voltage source is applied & which is positioned to enable the mesh to direct ions at some sort of substrate; (2) a support for the substrate, which support has the capability of oscillating &/or rotating, so as to cause movement of the substrate without contacting the conductive mesh & capable of providing 'even' exposure to the ions. No other structure is required in the independent claim 1 (i.e. no plasma generating means is necessitated & where the ions that are drawn by the voltage to the conductive mesh come from, is a method limitation effecting another method

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limitation). Dependent claims 2, 3 & 4 provide further description of structure or structural capabilities (that is presuming the claimed second mesh encapsulating the component, is a part of the apparatus, which isn't certain, since its location could have also been a substrate being treated, especially as it has no purpose or effect in the claims). Dependent claims 5-7, which are further describing the substrate being treated, provide no necessary or required structure to the apparatus, although claim 7 does require the capability of holding a component of an something (mechanical apparatus, heart, etc.) capable of pumping liquid (that the liquid is blood, is intended use of a product made using the component as a piece thereof, thus providing no apparent structural significance to the apparatus).

3. **Claims 5-6 are objected** to under **37 CFR 1.75(c)**, as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

As the substrate (i.e. component) being treated in apparatus, is not part of the apparatus, the **claims 5 & 6**, which merely recite that the component in question is "non-conducting" or polymeric, provide no apparent further limitation to the apparatus, hence cannot properly be said to be further limiting. Note that in claim 7, "component is part of a blood pump", while providing no specific structural requirement, does at least require the support to be capable of holding this component of unknown shape (i.e. shape is unspecified, so the limitation cannot require any specific structural holding means, only generic capability), whereas the requirements of dependent claims 5 or 6 do not necessitate any determinable capability requirements.

4. **Claims 1-14 are rejected** under 35 U.S.C. **112, second** paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In independent **claim 1**, the preamble of this claim recites "plasma processor for modifying at least a region of a surface of a component" (emphasis added), however the body of the claim requires the claimed apparatus to be "adapted...such that the component is moved...to **evenly expose it** to the ion bombardment..." (emphasis added), hence the preamble is **not commensurate in scope** with the body of the claim, as it not only does not require "evenly" exposing the surface, but specifically includes limiting the exposure, such that the entire surface is not exposed, i.e. is directed to a different scope.

Note that in patent claims, it is generally considered improper or undesirable to employ the pronoun "it", as it is often less clear or precise for specifying exactly what is being claimed. In this case, it may be considered uncertain whether "it", as used in the last two lines of **claim 1**, refers to the entire component, the surface of the component as mentioned in the preamble, or even to the mesh. While from the context, the examiner assumes that the intent was to -- expose the surface of the component to ion bombardment....., the claim language does not actually necessitate this, such that the use of "it" may be considered unclear or ambiguous. Independent **claim 8**, last line, has analogous use of "it", creating analogous issues.

Independent **claims 1 & 8**, both describe the conductive mesh as being "**non-conformal**", however neither the apparatus claim, nor the process claim recite with respect to what the mesh is non-conformal. Hence, it is unclear in the claims, *as written*, what other object's shape the mesh is required to not conform to, so could technically the claim language may refer to anything that exists in the world, although the examiner suspects that as there are known plasma processing techniques that employ conductive grid meshes that conform to a substrate shape (e.g. Matossian et al.), applicants probably intended the mesh to be non-conformal with respect to the claimed component (i.e. substrate), however no such requirement is actually present in the claims. Note if applicants amend the claims to specify with respect to what the mesh is nonconformal, they should explicitly cite support in the original specification.

Use of **relative terms** that lack clear metes and bounds in the claims, is vague and indefinite, unless clear definition is provided in the original specification or relevant cited prior art, or the specification can be shown to necessitate a definite scope. In independent **claims 1 & 8**, "evenly" used descriptively as "to evenly expose it" is a relative term, where it is uncertain how unvarying the exposure must be to be considered "evenly" performed &/or exactly what is the recipient of the even exposure, thus its context. It is noted that relevant usage of "evenly" is found on pages 2 & 4 of the specification, but no definitions of necessary scope. Also, "**the vicinity**" employed in lines 6-7 & the last line of independent claims 1 & 8, respectively, may be considered to be a relative term, if it is intended to indicate some unspecified range of distances, as well as lacking any antecedent basis (introduced with "the" indicating some inherent meaning (unapparent) or previous introduction). For purposes of examination, "in the vicinity" will be considered to encompass any distance or separation or location where ions passing through a mesh structure or its equivalent may impinge on a substrate/component surface.

In independent claims 1 & 8, it is required that the component be mounted on a rotating &/or oscillating support, however in dependent **claims 3 & 9** there is additional requirement of a second mesh that is non-conformal & nonconductive encapsulated in the first mesh, however the relationship between the claim of a support & the second mesh is completely unclear, as the second mesh's relationship & purpose with respect to the component being plasma treated is unspecified. Discussion in the original specification of a non-conducting mesh, as depicted in figure 2, starts in the paragraph bridging pages 4-5, through line 15 of page 5, and does not discuss use of a separate support with the electrically nonconductive mesh, but discusses using the second mesh to tumble workpieces within it that are being exposed to the bombarding ions, thus these claim limitations cannot be read in light of the specification to have a necessary meaning or relationship between the claimed support & the nonconductive mesh in the scope as claimed, although it appears that the specification's teachings would be sufficient to claim that the support is the second mesh.

5. The disclosure is objected to because of the following informalities: proofreading is needed.

For example: on page 3, line 23, see "and or"; page 4 introduces "first mesh 3", and page 5, line 3 "second mesh 6", however on line 10 of that page "first mesh 6" is discussed, thus appears to be mixing up the terminology & ref.#'s.

Appropriate correction is required.

6. Claims 3 & 9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As the national stage 371 is supposed to be a true copy of the PCT document as originally filed, dependent claims 3 & 9, which claim the movable non-conformal, non-conductive second mesh, separately & not necessarily associated with the claimed support for the component being treated, must be considered to introduce New Matter into the specification, as the original body at the specification that discusses this nonconductive mesh on page 4, line 31-page 5, line 20, does not teach a support separate from the nonconductive mesh that is used for tumbling workpieces, nor provide any means of attaching such a support to or in conjunction with the mesh configuration depicted in figure 2; noting the original summary on pages 2-3, also cannot be considered to suggest as presently claimed that the oscillating &/or rotating support & the movable nonconductive mesh are used together as separate entities. Therefore, the article 34 amendment of 10/10/2005 would appear to encompass New Matter by including options of employing separate oscillatory/rotary substrate support & movable nonconductive mesh encapsulated by the first mesh, although it also encompasses supported teachings, as a rotating &/or oscillating mesh containing components therein that are being tumbled, which is a species of independent claims 1 & 8 broader claim limitation. Note with respect to the US filing date, the article 34 amendment was filed with

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the US application, hence could be considered to limit the effect of filing date to the filing date of this application (3/27/2007), instead of being considered as new matter.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The **nonstatutory double patenting rejection** is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226

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(Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. **Claims 1, 5, 8 & 11-12** are rejected under 35 U.S.C. **102(b)** as being clearly anticipated by **Zega** (4,112,137).

**Zega** (abstract; figures, esp. 2; col. 3, line 30-col. 4, line 52, esp. col. 3, lines 43-65 & col. 4, lines 5-11, 20-30 & 43-52; col. 7, lines 11-46, esp. 37-46; col. 8, lines 25-37 & 50-66; col. 9, lines 15-40, esp. 24-26; col. 10, lines 24-32; & Exs., generally) teaches creating a glow discharge plasma, where ions from this plasma are accelerated via a negatively biased grid towards the substrate, which may be an insulating substrate, such as windscreen glass, so that the accelerated ions coat the substrate. It is further taught to move the substrate as illustrated by the arrows in figure 2 (e.g. oscillate), so as to prevent shadow effects of the grids wires (col. 7, lines 37-46 & col. 9, lines 22-26), which is considered by the examiner to be a form of evenly exposing, thus reading on the claimed process for the taught alternative of moving the substrate (instead of the grid) to prevent shadow effects. Note that the grid is in front of one face of the substrate, so does not wrap conformally around the whole substrate, thus this grid configuration is not considered to be conforming to the overall shape of the substrate & is considered to be consistent with a possible meaning of the requirement of "non-conformal".

9. **Claims 6 & 13** are rejected under 35 U.S.C. **103(a)** as being unpatentable over **Zega**, optionally in view of **Matossian et al.** (5,374,456).

**Claims 4 & 10** are rejected under 35 U.S.C. **103(a)** as being unpatentable over **Zega**, in view of **Matossian et al.** (5,374,456), which incorporates-by-reference **Conrad** (4,764,394).

While Zega teaches insulating substrate in general may be treated by his taught process, he does not specifically mention polymeric substrates, however plastic materials (i.e. polymers) are commonly & conventionally employed in large transparent objects such as windows, including use of plastic for transparent materials either as a base material or in composites, like coatings on glass, etc.; and windows are the type of specific products discussed for coating by Zega (col. 1, lines 11-16+), hence it would've been obvious to one of ordinary skill in the art to employ the process of Zega for plastic insulator material substrates, with a reasonable expectation of success, due to plastic being a conventional material included in the taught generic categories of windows, transparent materials & insulators, where one of ordinary skill in the art would reasonably have been expected to perform routine experimentation to optimize process for operational characteristics related to the particular substrate material being treated (e.g. temperature considerations or the like).

Alternatively, Matossian et al. ((456): abstract; figures; col. 1, lines 5-8; col. 2, line 52 for problems with plasma ion techniques, especially with irregular shapes or non-conducting materials, e.g.. epoxy; summary, esp. col. 3, lines 1-35+; col. 4, lines 7-25 & 56-65; etc.) also teach use of a biased grid for uniform treatment of a substrate with ions from a plasma, noting that techniques useful to avoid shadowing effects, such as placing the grid at a sufficient distance or relative movement of the grid relative to the object surface, with teachings especially directed to non-conducting polymer surfaces, such as epoxy polymers, including large surface dimension epoxy automobile components. Therefore, it would've been further obvious to one of ordinary skill in the art when considering the teachings of Zega, in view of Matossian et al., to consider polymeric substrates for the taught insulating substrates of Zega, as Matossian et al. demonstrate that conductive grid directed ions from plasmas may be effectively employed to treat polymeric substrates, inclusive of large polymeric substrates employed for automobile components, which is reasonably suggestive of substrates as suggested by Zega, as well as effectiveness of taught techniques with respect to polymeric substrates in general.

**Zega** differs from the present claims by not teaching the use of a pulsed voltage, however **Matossian et al.** (456), which as seen in the above discussion is directed to analogous plasma processing techniques, further teach it is preferred to apply pulsed negative voltages to the grid causing a pulsed negative potential thereon, and thus accelerate desired ions to the object being implanted or coated (col. 6, lines 8-16 & 63-col. 7, lines 35; and claims, esp. 1, 14 & 21-22), hence one of ordinary skill in the art would reasonably have expected pulsed voltage biasing applied to the conductive grid of **Zega** to effectively perform the ion plasma treatments therein, as it has been shown to be effective in analogous processing techniques, especially considering known advantages of using a pulsed voltage application, which **Matossian et al.** incorporates-by-reference (col. 7, lines 35-38) by citing **Conrad** (4,764,394) for plasma ion processing apparatus & procedure details, where **Conrad** teaches (col. 2, lines 18-36; col. 4, lines 10-25; col. 5, lines 37-50; col. 6, line 35-col. 7, line 46+) provides further discussion on using pulsed voltages for ion processing techniques, such as ion coating & ion implantation, providing advantages for the use of such pulsed high voltages, inclusive of relatively short duty cycles minimizing or eliminating surface damage from arcing; & in that relatively short pulsewidth of the repetitive pulses may provide spatial uniformity & implantation depth uniformity by choosing pulsewidth, such that the plasmas sheath formed around the substrate does not expand to contact the chamber enclosure or adjacent targets/substrates, during the time the voltages applied; etc.

10. **Claims 1, 4, 8 & 10-11** are rejected under 35 U.S.C. **102(e)** as anticipated by gr. in the alternative, under 35 U.S.C. **103(a)** as obvious over **Hanawa et al.** (2005/0214478 A1).

**Hanawa et al.** (2005/0214478 A1) teach generating a plasma in an upper chamber, then employing a ion shower grid or a plurality of grids with potential applied thereto (abstract; figures 3, 4, 8, 9A-B, 10, 19, 20, 21, 22, 24, 26 & 27; [0045]; [0050], etc.), to accelerate ions from the plasma to the upper surface of a substrate, such as exemplary substrates as illustrated in figures 28-30, where the examiner notes, as the surfaces of the substrates are not planar, the grid is not considered to be conformal

to the surface. Furthermore, as discussed in [0071] or [0097], & as illustrated in figure 9B, the substrate & the grids, while generally parallel have different surface areas, with [0097] & figure 9B teaching use of relative translated movement with respect to the ion generation region (which the examiner notes is the equivalent of oscillation), in order to achieve uniform distribution of ion flux from the ion shower grid across the substrate surface (i.e. evenly expose). It is further taught to employ pulsed voltage, either RF or DC to the ion shower grid ([0045]; [0053-56]; [0075]; [0077]; & [0103]), and that various grid constructions may be employed such as having holes perpendicular to the substrate surface, or tilted with respect to the substrate surface.

Applicants' claims require "a stationary non-conformal conductive mesh" to which the voltage for drawing the ions is applied, which is considered equivalent to the ion shower grid as taught by Hanawa et al., since while a mesh may refer to openings between threads or cords, or the net or fabric having the openings, it may also refer to similar openings in a network, designate screen size as number of openings, or that network. Alternatively, while the terms grid & mesh may have overlapping scope, they are not necessarily the same scope, however it would've been obvious to one of ordinary skill in the art that a woven electrically conductive structure or a net structure that may be called a mesh & is used to extract & direct ions, and a grid structure, also have been holes to extract & direct ions, are analogous structures employed for like purposes, thus reasonably expected to be employable interchangeably with the teachings of Hanawa et al., as long as one considers the teachings therein of employing orientation produced by the holes of the grid or mesh in directing ion passage therethrough.

11. It is noted that Shohet (5,298,010) has teachings analogous to those of Hanawa et al. (478), includes teachings with respect to nonconductive targets (i.e. substrates), and their grid 20, which passes the desired ions for the ion implantation region to the substrate, is explicitly taught that it is typically a mesh (col. 5, lines 30-42 & col. 6, lines 10-62), thus further supporting above alternative obviousness arguments. However, Shohet supplies pulsing via a different procedure & does not discuss

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whether or not their "target stage 14" (i.e. substrate holder) is necessarily stationary, or if they may employ movements such as rotation or translation.

Similarly, **Guenzel** (6,205,948 B1) teaches pulsed plasma immersion ion implantation (PIII) using a shielding grid around an electrode (i.e. nonconformal to substrate), where that grid is a mesh & has a pulsed negative voltage applied thereto, but again lacks discussion on whether or not they taught processing table may cause movement of the substrate, such as rotation of the substrate which is commonly employed in many gaseous processing techniques.

12. **Claims 1-2, 4-8 & 10-14** are rejected under 35 U.S.C. **103(a)** as being unpatentable over **Malik et al.** (6,504,307 B1), in view of **Yasui et al.** (4,676,195).

**Malik et al.** (abstract; figures; col. 1, lines 5-11 & 57-67+; col. 2, lines 44-64; col. 3, line 27- col. 4, lines 11 & 25-65; col. 5, lines 32-67+; col. 8, line 56-col. 9, line 67; col. 10, lines 44-65) modified the surface of a target substrate, such as a stent or catheter, using a plasma process, where the substrates are mounted on a central mandrel as illustrated in figures 1 or 2, which is surrounded by a grid (figures 1-3 & col. 8, line 56-col. 9, line 6), illustrated by a mesh & described as perforated, where pulsed voltages are applied to the grid & electrodes, so as to attract ions to the substrates (targets), with it taught that the voltage applied will determine whether ion implantation, deposition &/or mixing occurs; and when properly adjusted the bias voltage application protects target from being damaged or destroyed by arcing. It is further taught to control temperature to prevent overheating, where the predetermined temperature depends on the specific substrate, with mention of exemplary temperatures for stainless steel stents or exemplary threshold temperatures for polymeric materials, such as biocompatible polyethylene terephthalate, etc. **Malik et al.** teach that the target substrate may be oriented any position within the chamber needed to be achieve desired implantation or deposition, noting that the mandrel employed for holding taught substrates can be supported by an electrode as shown in figure 1 in a coaxial position, or can be suspended or supported in the interior of the chamber, however while teaching any possible

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orientation of the substrate, the primary reference does not specify oscillating or rotating the substrate during treatment. It is also noted that while Malik et al. does not specifically specify that components being treated include "part of a blood pump", their process is specifically directed to performing treatments that are biocompatible on exemplary substrates, such as stents or catheters, which are medical components that may be used for controlling blood flow. Note for instance, stents are used in arteries & the heart is a blood pump, thus the components treated by Malik et al. are consistent with the claimed component parts.

**Yasui et al.** (abstract; figure 3; col. 1, lines 35-50; col. 2, lines 5-25; col. 6, lines 56-68; claims 1, 3-4, 8-10 & 15-19) teach in analogous plasma processing apparatus structure, with a grid or hollow tubular net-like electrode surrounding a central substrate or substrates, where the substrate may be rotated, hence it would've been obvious to one of ordinary skill in the art, given Malik et al.'s teachings that any position that achieves the desired implantation or deposition may be employed, and where Yasui et al. shows in analogous process, with an analogous configuration, but rotates the substrate(s), so it would've been clear to one of ordinary skill in the art that such rotation would reasonably have been applicable to configurations as illustrated by Malik et al.'s substrates, such as stents or catheters mounted on a mandrel, as that rotation as taught by Yasui et al. has been shown to be effective & reasonably would have been expected to provide more uniform deposition, since the rotation would have been expected to equalize exposure differences caused by uneven shapes of substrates &/or by shadowing of the grid.

13. **Claims 1-3, 5-6, 8- 9 & 11-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Oyachi et al.** (4,613,403), in view of **Brum** (2003/075526 A1).

**Oyachi et al.** (abstract; figures 1 & 1B; col. 2, lines 52-col. 3, lines 20 & 44-60; col. 4, lines 46-col. 5, line 31; claims 1-7) teach treating golf balls made of balta resin, thermoplastic elastomer, ionomer resin or the like, with plasma gas, where one taught configuration as illustrated in figures 1 & 1B, employ a sealed casing (1) as one electrode & an inner electrode (8) as the other electrode, having high-frequency

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voltage applied thereto, with process gas input into the space in between these electrodes, and the golf ball substrates held in a rotatable mounted cage (5) inside the inner electrode, where one embodiment of the cage is a cylindrical net arrangement, as illustrated in figure 1B.

While Oyachi et al. provides details of the physical structure of the cylindrical net cage that is rotated, so as to move the golf balls during plasma processing, they do not provide details of the composition of the net cage, nor of the structure of electrode 8 that is illustrated as separate from & surrounding the rotatable cage, however it would have been obvious to one of ordinary skill in the art, that as the paired electrode structure is entirely outside the rotatable cage containing substrates, that the plasma necessarily forms outside the cage & flows into the cage after formation for the plasma treating process. Thus, one of ordinary skill the art would reasonably have expected the inner electrode to be structured so as to enable flow from where plasma forms into the taught rotating cage. It is noted that as the rotating cage is not the electrode, while its composition has not been disclosed, it would've been reasonable for one of ordinary skill in the art to expect that the net from which the cage is taught to be made would've been a non-conducting material, so as to prevent arcing between it and the adjacent electrode, and because teaching the rotating cage as a separate structure from the electrode surrounding it provides separate functions for these structures, implying that the cage is not biased.

Furthermore, **Brum** (2003/0075526 A1), also teaches plasma treating golf balls via application of high-frequency voltage between a central electrode & a rotating cylindrical basket tumbler, tumbling golf balls, where the rotating cylinder basket is made a perforated aluminum sheet metal, which has been anodized to form a protective coating (i.e. coated with an aluminum oxide dielectric coating), so as to prevent a burnt effect at the edge of the holes in the aluminum sheet during plasma treatment that would erode the holes & cause substantial contamination. Therefore, it would've been further obvious to one of ordinary skill in the art that given the net structure of the rotating cage of Oyachi et al., plus the taught protective coating & its purpose/effects as set forth in Brum, to employ a nonconductive material, so as to

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avoid "burnt effects" & contamination that the teachings of Brum suggests would occur, if the rotating cage of Oyachi et al. was conductive & had edge discharge effects at holes in the net. Also, as Oyachi et al. does not suggest a specific structure for electrode 8, only that implied by the illustrated configuration surrounding the rotatable cage, especially in view of their alternative embodiment of figure 2, where the rotatable cage is the electrode, one of ordinary skill in the art considering the requirement for the plasma to treat the substrates in the cage, & in view of analogous electrode structure of Brum, would reasonably have employed a perforated, or mesh or net electrode structure, consistent with the overall intent & purpose of the plasma treatment & suggested by the combined teachings.

14. **Claims 1-3, 5-6, 8- 9 & 11-13** are provisionally rejected on the ground of nonstatutory **obviousness-type double patenting** as being unpatentable over claims 1-3, 6-9, 12-15, 19-20, 23-36, 40-46, 48-49 & 51-57 of copending Application No. **10/598,055**, in view of **Malik et al.** (6,504,307 B1) plus **Yasui et al.** (4,676,195), particularly with respect to claim 2, 7 & 14, or in view of **Hanawa et al.** (2005/0214478 A1).

Or Claims 1-2, 4-8 & 10-14 are provisionally rejected on the ground of nonstatutory **obviousness-type double patenting** as being unpatentable over claims 1-3, 6-9, 12-15, 19-20, 23-36, 40-46, 48-49 & 51-57 of copending Application No. **10/598,055**, in view of **Oyachi et al.** (4,613,403), & further in view of **Brum** (2003/075526 A1).

The copending application (**055**) has claims directed to plasma apparatus for treating the substrate via generation of the plasma, where the apparatus includes any plasma control electrode (&/or guard wall), with driving means to effect relative movement between plasma control electrode &/or plasma source &/or substrate; where the plasma control electrode may have apertures or be a mesh positioned between the plasma source & the substrate; where relative movement limitations include rotation of the substrate, where the plasma control electrode may be stationary; & where the treatment provided by the plasma apparatus may cause treating (e.g. coating) in a uniform manner.

Copending (055) differs from the present claims by not combining limitations where the plasma control mesh electrode (positioned between plasma source & substrate) is stationary, while the substrate is being rotated (&/or oscillated), and in these copending (055) apparatus claims, the substrate is not prohibited from touching the mesh electrode. The copending claims also differ by not reciting the current dependent claim limitation with respect to application of pulsed voltage to the conductive mesh (i.e. electrode). The copending case also is not directed to method claims, however the present method claims are directed at generic actions for which the apparatus is designed, hence it would've been obvious for one of ordinary skill in the art to perform claimed processes, given the claimed apparatus. However, the above discussed references of **Malik et al.** plus **Yasui et al.**, particularly with respect to meshes that encapsulate substrates being plasma treated, as well as **Malik et al.**'s suggesting treatment of medical substrates used with blood pumps, or **Hanawa et al.** (2005/0214478 A1), or **Oyachi et al.** (4,613,403), in view of **Brum** (2003/075526 A1), as discussed above, provide teachings showing grid &/or mesh electrodes used as shields & control ion direction for treatment of substrates, that employ presently claimed movements & pulsed voltages in claimed configurations, thus it would've been obvious to one ordinary skill in the art to employ such known combinations of limitations & operating procedures, as they would reasonably have been expected to be applicable to the generically claimed movements and configurations of the copending application claims, with a demonstrated expectation of useful results.

This is a provisional obviousness-type double patenting rejection.

15. **Claims 1-2, 5, 8 & 11-12** are rejected under 35 U.S.C. **102(b)** as being clearly anticipated by **Nishibayashi et al.** (5,417,798).

**Nishibayashi et al.** (abstract; figures, esp. 2; col. 4, line 60-col. 5, line 40; & col. 6, lines 10-68, esp. 20- 30 & 40-48) teach forming a plasma as illustrated in figures 1 or 2, where ions from the plasma are passed through a metal grid, which may be a metal network ( $\equiv$  mesh) to which a voltage is applied. The ions are employed for reactive ion etching a diamond specimen substrate (a nonconductive

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component), which has been coated with an aluminum mask (i.e. the surface is not perfectly planar, hence the grid between it and the plasma is not conformal thereto). Nishibayashi et al. teach several embodiments, where the one particularly of interest with respect to the present claims is that of figure 2, which employs a rotating shaft to cause rotation of the substrate support (lower electrode 2) & the substrate thereon. Nishibayashi et al. specifically teach that the action of motion & the kinetic energy of the ions were nearly uniform on the surface of the specimen (i.e. substrate).

16. **Other art** of interest includes: **Nishiuchi et al.** (2001/0036508 A1) who teaches vapor deposition process, such as ion plating, where multiple workpieces are tumbled in rotating mesh barrels (Ti or stainless steel net), which are in turn attached to a rotating support structure; & **Matossian et al.** (5,455,061) having teachings relating to those of Matossian et al. (456) discussed above, except relating to an indicator layer used in analogous processing to provide a measurement technique.

Depending application 12/225,022 is noted to be of interest, having method claims 39 & 40 directed to plasma immersion on an eye implanting polymer substrates, thus related to present claims 12-13, as well as the intended use of apparatus claims 5-6. **Wei et al.** (2009/0286012 A1), while not prior art, is directed to PIII processes for treating three-dimensional objects using voltage applied to mesh cages, however the published claims lack limitations with respect to motion.

17 him. **Any inquiry** concerning this communication or earlier communications from the examiner should be directed to **Marianne L. Padgett** whose telephone number is **(571) 272-1425**. The examiner can normally be reached on M-F from about 9:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained

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/Marianne L. Padgett/  
Primary Examiner, Art Unit 1792

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4/27-30/2010